

INSTRUCTION MANUAL

TYPE 210

QUAD VIDEO MIXER

VISTA SYSTEMS inc

© COPYRIGHT 1974 BY VISTA SYSTEMS, INC.

## TABLE OF CONTENTS

		PAGE
SECTION 1	TYPE 210 QUAD VIDEO MIXER SPECIFICATIONS	
	1.1 General Description	1
	1.2 Electrical Specifications	1
SECTION 2	INSTRUCTIONS FOR USE	
	2.1 Interconnection	3
	2.2 Operation	3
SECTION 3	CIRCUIT DESCRIPTION	4
SECTION 4	MAINTENANCE	
	4.1 Setup and Adjustment	6
	4.2 Corrective Maintenance	
	4.3 Schematic Diagrams	
SECTION 5	PARTS LIST	

## SECTION 1

## TYPE 210 QUAD VIDEO MIXER SPECIFICATIONS

## 1.1 GENERAL DESCRIPTION

The Vista Systems TYPE 210 QUAD VIDEO MIXER permits mixing video signals from as many as twelve 75 ohm sources onto one line. The TYPE 210 contains four separate video mixing amplifiers, each with four controllable inputs. The mixed signal is available on each of three 75 ohm outputs. When ordered with Option 01, inputs and outputs appear on rear-panel BNC jacks. When ordered with Option 02, the TYPE 210 contains all power supplies and drive generators necessary to operate 4 Sony Model AVC-3400 portapak cameras.

## 1.2 ELECTRICAL SPECIFICATIONS

The following performance is provided without warmup at any ambient temperature between +10°C and +50°C.

<u>Characteristic</u>	<u>Performance</u>
Maximum gain.....	1 dB
Feedthrough at minimum gain.....	At least 50 dB below 1 volt at 3.58 MHz.
Frequency response.....	Within $\pm 0.5$ dB, DC to 6 MHz
Differential gain at 3.58 MHz.....	Less than 5%, black through white.
Differential phase at 3.58 MHz.....	Less than 3°, black through white
K factor, 2T pulse.....	Less than 2%
DC offset.....	Adjustable to 0 volts



For proper operation, the following electrical terminal conditions must be observed.

<u>Terminal Characteristic</u>	<u>Condition</u>
Maximum DC level of input signal.....	1.5 volts
Required drive signals, Option 01....	Vertical and Horizontal drive at EIA standard levels
AC line voltage.....	Between 105 and 130 volts.

The TYPE 210 presents the following electrical terminal conditions.

<u>Terminal Characteristic</u>	<u>Condition</u>
Impedance, all signal inputs.....	75 ohms within 5 ohms
Signal output impedance.....	Low, terminate in 75 ohms
Impedance, all drive inputs.....	High impedance, loopthrough
Camera power supply capability..... Option 01	2 amperes at 12 volts
Horizontal drive output, Option 01...	Inverted drive, 8 volts peak-to-peak
Vertical drive output, Option 01.....	8 volts peak-to-peak
Camera connectors, Option 01.....	Four 10-pin to match plugs on Sony model AVC-3400 cameras
AC power requirement.....	10 watts, nominal
AC power requirement, Option 01.....	65 watts, nominal
Front panel connector type.....	Switchcraft "Tinijax" Type 41
Rear panel connector type.....	BNC

Vista Systems, Inc.

## SECTION 2

## INSTRUCTIONS FOR USE

## 2.1 INTERCONNECTION

The Vista Systems TYPE 210 QUAD VIDEO MIXER operates with standard non-composite video signals as inputs, and produces outputs which are the mixed sum of the inputs. Each amplifier has four inputs, each with independent video level control, and three 75 ohm outputs. All input signals at each amplifier are additively mixed in proportions determined by the settings of the front-panel level controls. The basic TYPE 210 with no options requires no drive signals. The only connection to be made are video inputs and outputs.

The TYPE 210, Option 02, contains power supplies and drive generators necessary to power up to 4 Sony Model AVC-3400 portapac cameras. Horizontal and vertical drive signals must be connected to the appropriate rear-panel jacks, and terminated in 75 ohms. The cameras are then connected to the Sony 10-pin jacks on the rear panel. Video from these cameras then appears on the top four connectors designated CAMERAS on the front panel.

In addition to the above functions, the basic instrument contains six coaxial conductors which terminate in BNC jacks on the rear panel and miniature phone jacks on the front panel. The purpose of these conductors is to permit easy introduction of signals from external sources to the front-panel patching system.

## 2.2 OPERATION

Signals to be mixed are connected to the mixer inputs by plugs inserted in the front-panel jacks; or, in the case of instruments with Option 01, by connection to the rear-panel input jacks. With all front-panel controls rotated fully CCW, no signals will appear on the output. A signal is brought to the output by rotation of the front-panel gain controls. Full CW rotation causes the signal to be carried to the output with no attenuation. The level of each component signal present at the output is proportional to rotation of the corresponding front-panel gain control. Each mixer produces identical mixed signals on each of 3 outputs.

## SECTION 3

## CIRCUIT DESCRIPTION

The Vista Systems TYPE 210 QUAD VIDEO MIXER consists of an amplifier power supply, four mixing amplifiers, and, in the case of Option 02 instruments, a camera power supply and camera drive generator circuits.

The amplifier power supply includes a transformer, dual full-wave rectifier, filter capacitors C101 and C102, zener reference diodes CR105 and CR106, dual op-amp IC101, and pass transistors Q101 and Q102. Each zener diode provides a reference of 14 volts. The power supply output voltage is compared with this reference voltage in IC101, and an amplified error voltage is delivered to the base of the pass transistor. If the power supply output voltage is higher than the reference voltage, the voltage at the base of the pass transistor is reduced until the output voltage is correct.

Each video mixing amplifier consists of four emitter-follower input buffers, Q1, Q2, Q3 and Q4, a resistive adding network, a differential amplifier with feedback, and an output driver emitter-follower. Each input is terminated with a 100 ohm front-panel pot which also provides video level control. After mixing in a network of 330 ohm resistors, the combined signal passes through a PNP emitter-follower, Q5, which provides DC thermal variations equal and opposite to the input emitter-followers, thus cancelling thermal drift in the input stages. This emitter-follower drives differential amplifier Q6 and Q7 which uses a type 1N5232 zener diode to maintain proper DC levels, and a voltage divider consisting of a 2.7K ohm and 330 ohm resistor which stabilizes the amplifier by providing collector-to-base feedback.

The output driver includes a PNP transistor Q8, and NPN transistor Q9 which provide putput buffering and thermal drift cancellation as in the input stages. DC offset from input to output can be adjusted to 0 volts by the 500 ohm trimpot located adjacent to the differential amplifier.

The Porta-Pack camera power supply includes a full-wave rectifier, Motorola type MFC6030A low-current regulator, IC102, Motorola MPS-U01 pass transistor, Q103, which provides 8 volts to the camera drivers, and an MJ1001 darlington power transistor Q104, stabilized by a 1N5244 zener diode, CR109. The latter regulator provides approximately 13 volts up to 2 amperes to power as many as 4 Porta-Pack cameras.

Vista Systems, Inc.



The camera drivers employ high-speed transistor switches to generate the drive voltages necessary to operate the Porta-Pack cameras. The horizontal drive pulses are of inverted (positive-going) polarity, and are 7 volts peak-to-peak. The vertical driver includes an inverter Q107, so that the output pulses are of standard duration and polarity but are 7 volts peak-to-peak.

Each driver consists of a complementary-symmetry switch utilizing one PNP and one NPN transistor with collectors connected together. The emitter of the PNP is connected to the 8 volt supply, and the emitter of the NPN is connected to ground. Base bias resistors are connected so that in the absence of drive, one transistor is biased on while the other is biased off. Since the transistors are in series, there is no current flow in this condition. The presence of a pulse at the input reverses the states of the driver transistors so that the output is alternately switched between ground and +8 volts.

## SECTION 4

## MAINTENANCE

## 4.1 SETUP AND ADJUSTMENT

The only setup adjustments required for correct operation of the TYPE 210 are those necessary to establish the output DC offset at 0 volts. To accomplish this, first rotate all mixer gain control knobs fully CCW. Connect one output of one mixer to the input of an oscilloscope, terminated in 75 ohms. Adjust the 500 ohm trimpot, R17, so the output observed on the oscilloscope is 0 volts. Complete this procedure for each of the four mixer amplifiers.

Instruments with Option 02, the camera power supply and drive generators, also require adjustment of a power supply voltage. Connect an oscilloscope or voltmeter probe to the emitter of Q103. Adjust R105, the 1K ohm trimpot, so that the potential at this point is 8 volts.

CAMERA DRIVER AND POWER SUPPLY

The only setup adjustment necessary in this section is establishing the pulse driver power supply at 8 volts with the trimpot located adjacent to the MFC6030A regulator.



